

CLAIMS

I claim:

1. A borehole logging apparatus for deep well drilling comprising:

a device for transmitting from a borehole through the drilling fluid signals characteristic of measured data obtained while drilling the borehole,

a hydromechanical signal transmitter responsive to signals characteristic to the measured data for generating in the drilling fluid a coded series of pressure pulses characteristic of the measured data; and

a flow regulator for controlling the current of drilling fluid directed to the signal transmitter in response to a pressure differential generated by restricting the current of drilling fluid entering the device so that the current of drilling fluid directed to the signal transmitter is automatically adjusted to flow values optimal for the generation of significant pressure pulses.

2. The borehole logging apparatus as claimed in claim 1 wherein the compression spring has a progressive characteristic.

3. The borehole logging apparatus as claimed in claim 1 wherein the opening cross-section of the bypass opening increases degressively as the travel of the control piston increases in the opening direction.

4. A borehole logging apparatus for deep well drilling, comprising:

a device for transmitting from a borehole through the drilling fluid to the earth's surface signals characteristic of measured data obtained while drilling,

an elongated housing, which is adapted for insertion in the drilling fluid conduit of a drill string, includes at its influx end an entrance opening leading into a central housing conduit and has, downstream from the entrance opening, a sealing ring effecting a seal against the drill string,

said elongated housing further includes a bypass opening arranged downstream from the sealing ring and leading from the central housing conduit into the drilling fluid conduit of the drill string,

and a hydromechanical signal transmitter which is arranged in the elongated housing and has, downstream from the bypass opening, a passageway connecting the central housing conduit with the drilling fluid conduit of the drill string, and which controls a closure element by means of which the passageway is adapted to be throttled at least in part,

wherein said closure element is repeatedly movable, at intervals and in response to signals characteristic of measured data to be transmitted, from a passing position into a throttling position and back again into the passing position in order to generate in the drilling fluid a coded series of positive pressure pulses corresponding to the signals,

wherein the elongated housing accommodates in its interior a flow regulator having a control piston, which controls the current of drilling fluid through the bypass opening in response to the pressure differential generated at the entrance opening and to the force of a spring, in such manner that the drilling fluid current, which is fed to the signal transmitter, is maintained at flow values optimal for the generation of significant pressure pulses, and the remaining excess drilling fluid current is routed to the drilling fluid conduit via the bypass opening.

5. The borehole logging apparatus as claimed in claim 4 wherein the control piston has a throttling section controlling the cross-section of passage of the bypass opening, and a measuring section serving as a pressure sensor, and the throttling section and the measuring section are interconnected by a tappet.

6. The borehole logging apparatus as claimed in claim 5 wherein the measuring section is arranged in a chamber disposed upstream from the entrance opening in the elongated housing, which chamber is divided into two compartments by the measuring section, whereof the first compartment, which is located at the end of the measuring section remote from the tappet, is connected to the drilling fluid conduit of the drill string, and whereof the second compartment, through which the tappet extends, is connected to the housing conduit, through which the tappet is passed, and receives therein a compression spring bearing against the measuring section with a spring force.

7. The borehole logging apparatus as claimed in claim 4 wherein the compression spring has a progressive characteristic.

8. The borehole logging apparatus as claimed in claim 4 wherein the opening cross-section of the bypass opening increases degressively as the travel of the control piston increases in the opening direction.